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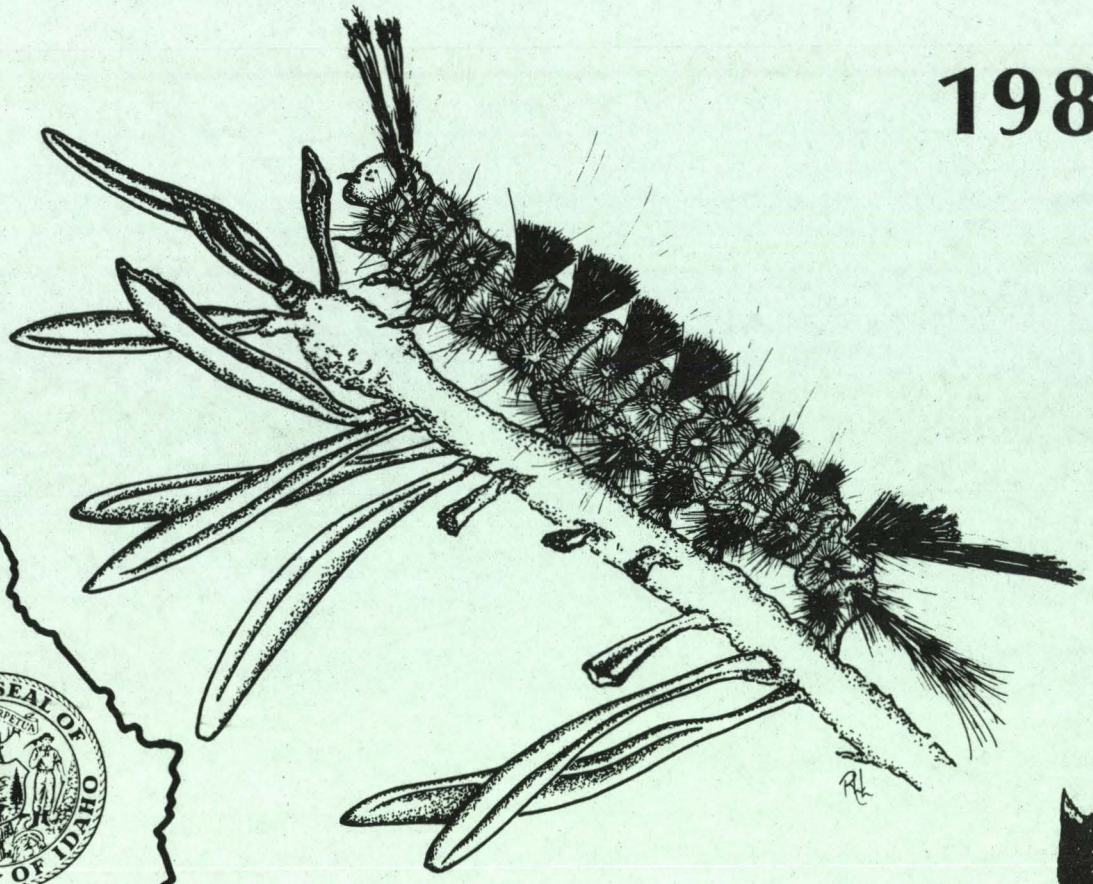
IDAHO FOREST PEST CONDITIONS & PROGRAM SUMMARY

1985



IDAHO DEPARTMENT OF LANDS

USDA Forest Service
NORTHERN and INTERMOUNTAIN
REGIONS

Report No. 86-1

IDAHO FOREST PEST CONDITIONS AND PROGRAM SUMMARY

1985

by

John W. Schwandt, Pathologist
R. Ladd Livingston, Entomologist
David P. Beckman, Technician
IDAHO DEPARTMENT OF LANDS
Coeur d'Alene, Idaho

Robert L. James, Pathologist
Scott Tunnock, Entomologist
USDA FOREST SERVICE, NORTHERN REGION
Missoula, Montana

K. Andrew Knapp, Biological Technician
USDA FOREST SERVICE, INTERMOUNTAIN REGION
Boise, Idaho

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INTRODUCTION

This report summarizes the results of aerial and ground surveys and associated activities conducted by pest management personnel within the Idaho Department of Lands and the Northern and Intermountain Regions, USDA Forest Service during 1985. Major insect and disease damage on forested lands of all ownerships within the State is described. Tables indicating amount of damage and maps showing location of major insect infestations are included. Tree mortality counts recorded in the tables should be regarded as estimates. Location and trend of damage from year to year can be determined by comparing maps and mortality estimates from previous reports.

CONDITIONS IN BRIEF

Mortality caused by the mountain pine beetle in southern Idaho forests decreased substantially since 1984. In northern Idaho, the mountain pine beetle outbreak in the Red River-Elk City area is continuing to grow. The Craig Mountain outbreak had significantly less total mortality in 1985 although it included more ponderosa pine mortality than in 1984. The small hot-spot near a Bonners Ferry mill was treated to prevent further spread.

Douglas-fir beetle activity decreased significantly in northern Idaho forests but more than doubled in southern Idaho areas. The spruce beetle has become a major concern in the Payette Lakes area near McCall where salvage efforts are trying to reduce losses. Mortality caused by the pine engraver continued to decline throughout the state and the fir engraver damage was also at low levels statewide with the exception of isolated areas near Lake Coeur d'Alene.

Defoliation caused by the western spruce budworm increased and intensified during 1985. The Douglas-fir tussock moth population in northern Idaho continued to grow and appears to be reaching outbreak levels. Pheromone control treatments for the western pine shoot borer continue to reduce losses in ponderosa pine plantations, although one plantation was severely damaged by the gouty pitch midge. Seed production in white pine seed orchards was greatly increased by controlling seed and cone insects. In previously identified areas, damaged caused by the balsam woolly adelgid increased in 1985 but no new areas of infestation were located.

Root diseases and white pine blister rust continue to be the most perplexing disease problems in northern Idaho while dwarf mistletoes are the major concern in southern Idaho. Several projects to evaluate effects of silvicultural treatments on root disease occurrence and spread were continued during 1985. Progress is being made on developing a root disease model which will link to the PROGNOSIS growth model, and a guide for estimating blister rust hazard is in the final stages of preparation.

Snow accumulations during the 1984-85 winter were unusually heavy and resulted in considerable snow breakage in many stands throughout the State. An unusually hot period of weather in early spring followed by a severe drought through July caused the foliage to dry out and resulted in premature needle shed of older needles in many species throughout the State. However, this weather

pattern was not conducive to the spread of needle cast fungi, so incidence of needle casts were generally lower than last year. The only major needle cast problems occurred where infection had taken place during the prior year.

Nursery diseases continue to be a major concern as demand for seedlings continues to grow. Fungi-causing disease problems in 1985 include the following: Fusarium, Botrytis, Meria, Sirococcus, Diplodia, and Phoma.

INSECTS

BARK BEETLES

Mountain Pine Beetle

In nine reporting areas, in northern Idaho, the reported number of red faders (trees attacked by the mountain pine beetle the previous year) decreased from about 117,000 in 1984 to about 32,000 in 1985 (Table 1). However, we feel that the number of lodgepole pine faders on the Red River and Elk City Ranger Districts were not estimated accurately. In 1984, there were over 45,000 faders on these two Districts. Survey data indicated there was a build-up ratio of killed trees of 6.8:1 from 1983 to 1984, thus we anticipated that there should have been more faders in 1985 than there were in 1984. These Districts are promoting an aggressive salvage-logging and harvest program, so many of the faders were probably cut during 1984 and 1985. Seven stands on the Red River Ranger District were evaluated for mountain pine beetle damage in 1985. Data showed that an average of 0.8 pines per acre was killed in 1984 compared to 1.5 pines per acre in 1985 in these areas. This indicates the outbreak is not dying out. There was an increase from 640 in 1984 to 1,787 pine faders in 1985 on the Idaho Panhandle National Forests mainly on private lands near Bonners Ferry. The attacks in this area are concentrated around the lumber mill and town of Moyie Springs. The very rapid buildup from 1984 to 1985 and the proximity of the majority of the attacks to the mill site suggest that beetles may have been hauled into the area in infested logs coming from beetle epidemic sites in Montana. A control project was conducted just prior to beetle flight in 1985 where approximately 1,000 infested trees were cut and treated with a pesticide to kill emerging beetles. A task force was also established to determine the best management practices available for continuing to deal with the problem. Accordingly, the mill has agreed to accelerate utilization of beetle infested timber, and a survey and follow-up salvage effort are planned for early 1986.

Another significant decrease occurred in the Craig Mountains. Numbers of faders changed from 51,050 in 1984 to 27,847 in 1985. Despite this decrease in overall numbers, the beetle population is continuing its aggressive attacks in the lodgepole pine and has increased substantially the number of attacks in ponderosa pine. In prior years only very scattered attacks in ponderosa pine were seen. In 1985 there were many groups of 100-200 attacked trees and dozens of smaller groups. Overall, the infestation has now moved to the north and west of Soldier's Meadows Reservoir. If the population continues to increase

in the ponderosa pine, it could, once again, move back through the Craig Mountain area killing thousands of additional trees. Decreases also occurred on the Clearwater National Forest, within the Salmon and Selway Wilderness areas of the Bitterroot National Forest, in the Cataldo Forest Protective District, and in the Clearwater/Potlatch Timber Protection area.

In contrast to 1984 conditions, mountain pine beetle activity decreased in southern Idaho in 1985 when approximately 19,000 lodgepole and ponderosa pines were killed. The largest infestations occurred forestwide on the Caribou National Forest, but even this infestation was lower than 1984 levels. Elsewhere significant infestations were noted around Deadwood Reservoir and Warm Lake on the Boise National Forest, Warm Springs Creek, and Cassia Division of the Sawtooth National Forest, and in the Squaw Creek and Castle Creek drainages on the Challis National Forest. The infestation in the Castle Creek and Camas Creek vicinity on the Salmon National Forest remained static. Infestations on the Payette and Targhee National Forests declined. On the Payette National Forest mortality was concentrated in the Goose Creek, Lick Creek, and Paddy Flats areas. The most dramatic drop occurred on the Targhee National Forest where most activity was noted around Palisades Reservoir.

Specific mortality figures summarized from aerial detection surveys are displayed in Table 1.

Table 1.--Bark beetle infestations in Idaho, 1984-1985.

		-- MOUNTAIN PINE BEETLE --			-- DOUGLAS-FIR BEETLE --			-- SPRUCE BEETLE --			-- PINE ENGRAVER --			-- FIR ENGRAVER --		
			Estimated mortality			Estimated mortality			Estimated mortality			Estimated mortality			Estimated mortality	
Area	Year	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume
IPNF'S	1984	830	640	251.7	138	375	131.3	6,262	980	392.0	10	15		17	87	17.4
	1985	1,337	1,787	502.6	66	296	--	73	147	58.8	--	180	--		507	101.4
Clearwater	1984	4,390	9,065	813.7	5,700	7,757	1,706.8									
NF	1985	--	2	0.8	--	491	--								1,158	231.6
Bitterroot	1984	--	9,000	--		7,800										
NF	1985	--	2,144	--	105	247	--									
Nez Perce	1984	18,258	46,314	4,166.1	--	9,000	--	3	7	2.8	7	75	--			
NF[1]	1985	7,041	--	--	579	1,336	467.6								8	1.6
Priest	1984								74	29.6					5	
Lake NF	1985															
Pend	1984				1	5	1.8				183	310		1	5	1.0
Oreille NF	1985				--	35	12.2					20			18	3.6
Mica	1984				28	180	63.1				5,242	3,177		29	160	32.0
FPD	1985	--	10	0.8	--	482	168.7					1,809			762	152.4
Cataldo	1984	656	1,000	90.0	1	3	1.0				21	13				
FPD	1985		500	45.0	--	25	8.7					15			11	2.2
W. St. Joe	1984	1	10	0.9	96	224	78.4				1,383	835		336	660	132.0
FPD	1985	--			--	581	203.3					773			2,133	426.6
Kendrick	1984				19	187	65.5				34	181		58	390	78.0
FPD	1985				150	60	21.0					301			255	51.0
CPTPA	1984	107	332	144.4	973	1,239	433.7				31	15		95	383	76.6
	1985	--	66	26.4	--	882	308.7					7			302	60.4
Craig	1984	6,257	51,050	4,594.5	672	800	280.0				112	713		24	23	4.6
Mts. FPD	1885	--	27,847	--	--	28	--				--	85		--	15	--
Maggie	1984				101	420	147.0							5	26	5.2
Cr. FPD	1985															

Area	Year	MOUNTAIN PINE BEETLE Estimated mortality			DOUGLAS-FIR BEETLE Estimated mortality			SPRUCE BEETLE Estimated mortality			PINE ENGRAVER Estimated mortality			FIR ENGRAVER Estimated mortality		
		Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume	Acres Infested	Trees	Volume
Boise	1984	24,612	14,016		130	183		--	--		430	603				
NF	1985	6,256	4,828	308.5	275	227	32.0	55	84	33.6	270	392	19.6			
Caribou[2]	1984	24,987	13,200		--	--		--	--		--	--				
NF	1985	8,029	7,995	510.8	2	51	7.1	--	--	--	--	--	--			
Challis[2]	1984	1,424	1,115		--	--		--	--		--	--				
NF	1985	1,105	1,170	74.7	10	14	1.9	--	--	--	--	--	--			
Payette	1984	2,327	2,868		170	257		50	70		15	21				
NF	1985	1,084	1,090	69.9	130	189	26.6	3,881	2,604	1,041.6	--	--				
Salmon	1984	559	788		20	28		10	14		190	301				
NF	1985	272	381	24.3	30	42	5.9	--	--		113	120	6.0			
Sawtooth	1984	2,137	2,934		20	28		--	--	--	--	--	--			
NF	1985	2,047	2,691	171.9	145	141	19.8	--	--	--	--	--	--			
Targhee	1984	18,706	11,803		30	48		--	--	--	--	--	--			
NF	1985	345	482	30.8	572	484	68.2	--	--	--	--	--	--			
Totals	1984		164,135			32,997			1,145			6,259			1,739	
	1985		50,994			5,611			2,835			3,702			5,169	

1/ Due to insufficient data in 1985, number of trees killed by the mountain pine beetle could not be estimated.

2/ Only portions of Forest flown; actual mortality figures are probably considerably higher.

Douglas-Fir Beetle

In northern Idaho, there was a big decrease in numbers of trees killed by the Douglas-fir beetle from 1984 to 1985. Numbers of red faders decreased from 27,990 to 4,463. The biggest decreases were on the Clearwater, Bitterroot and Nez Perce National Forests, and in the Craig Mountains (Table 1). On the Clearwater NF, mortality was less in the North Fork of the Clearwater River because most of the slash from the severe 1983 windstorm had been cleaned up or treated with the antiaggregating pheromone MCH in 1984. On the Bitterroot NF, mortality was less around the large areas burned in the late 1970's within the Selway Wilderness Area. Douglas-fir beetle activity continues in about the same areas infested during 1984 on the Nezperce NF. Groups of faders were detected along the Salmon River complex in the following drainages: Bargamin Creek, White Bird Creek, Skookkumchuck Creek, Slate Creek, John Day Creek, and west of Riggins along the south half of the "Island" to the Payette NF. On the Fenn Ranger District groups were seen along O'Hara and Meadow Creeks. Only 28 red faders were detected within the Craig Mountains in 1985. Douglas-fir mortality in southern Idaho more than doubled in 1985 due to Douglas-fir beetle activity. The most significant increases were noted in the South Fork Boise River drainage on the Boise and Sawtooth National Forests and in both Big and Little Elk Creek and Indian Creek drainage on the Targhee National Forest. Elsewhere trends were mostly static. Specific mortality figures, as noted by aerial detection surveys, are found in Table 1.

Douglas-fir beetle attractant pheromones were utilized as baits in several areas of State land to help assure control of beetles that developed in slash following the 1983 windstorm. In several areas where beetles were known to be present, the pheromones were used to bait standing green trees and some log decks. Trees were also baited within a road right-of-way that was cut in the summer of 1985. In all cases the baits served to attract large numbers of beetles which were hauled out of the area in the infested logs and presumably destroyed during the manufacturing process. Follow-up ground surveys found only one group of bark beetle-attacked Douglas-fir near the treatment areas. We assume that this technique has helped save many other trees from attack.

Spruce Beetle

Spruce beetle infestations in northern Idaho have declined to the point of being nearly nonexistent. The few scattered dead tree groups mapped during 1985 flights were found in Blue Joe, Grass, and Cow Creek drainages and along the west fork of Smith Creek of the Bonner's Ferry Ranger District; and near Gold Creek and Hughes Creek, tributaries of upper Priest River on the Priest Lake Ranger District. These scattered mortality groups are mainly in the vicinity of the outbreak that occurred in the early 1980's. No additional special management activity has been planned.

In southern Idaho the spruce beetle has become a major concern on the Payette National Forest where over 2,600 beetle-killed Engelmann spruce trees were detected in aerial surveys conducted in 1985 (Table 1). Activity was noted on the McCall, New Meadows, and Council Ranger Districts, especially in the Bear Creek, Boulder Creek, Elk Meadows, Hazard Lake, Goose Lake, North Fork Payette River, and Lick Creek vicinities. Infestations are also heavy on State lands

on the north side of Payette Lake and on sections scattered throughout the overall infestation area (see map). Ground surveys are finding significantly higher numbers of attacked trees, especially those attacked in 1985 that have not yet begun to fade. An estimated 13,775 infested trees have been found to date. Woodpeckering of newly attacked trees is prevalent. Specific mortality figures, as noted by aerial detection surveys, are found in Table 1. Evaluations, suppression activities, and salvage efforts have begun. On the Boise National Forest fewer than 100 trees were killed by spruce beetle but this trend is higher than 1984.

Pine Engraver

Pine engraver-killed trees in northern Idaho continued to decline in 1985, dropping from approximately 6,200 trees in 1984 to 3,600 in 1985. This continues a downward trend from 1983 when approximately 16,300 pine engraver-killed trees were recorded. The very dry spring and early summer of 1985 may reverse this trend.

In northern Idaho the activity is consistently found along the drier ponderosa pine stands at the edges of the forested areas. Approximately one-half of the activity was in the Rathdrum Prairie, north and west of Coeur d'Alene, where approximately 1,800 trees were killed.

Pine engraver beetle activity on ponderosa pine in southern Idaho decreased from 925 trees killed in 1984 to 512 in 1985. Mortality was noted in the Boise Basin and Fall Creek drainages on the Boise National Forest and in the Granite Mountain vicinity on the Salmon National Forest. Specific mortality figures, as noted by aerial detection surveys, are found in Table 1.

Fir Engraver

The fir engraver is traditionally a pest of northern Idaho. Populations have fluctuated in response to host tree stresses caused by root disease, drought or defoliation. More trees were killed by this beetle in 1985 (5,154) than in 1984 (1,765). Over 75 percent of the 1985 faded trees were found in the area between Moscow and the southern end of Lake Coeur d'Alene. Root rot is very prevalent in that vicinity.

The activity levels in other areas of traditionally high beetle attacks have decreased in 1985, specifically the area near Weippe in Clearwater County.

The very dry spring and early summer of 1985 provided ideal conditions for survival for this insect and may contribute to an increased number of killed trees which will show up in the 1986 surveys.

DEFOLIATORS

Western Spruce Budworm

In northern Idaho budworm defoliation was detected again on the same two National Forests infested during 1984. It decreased somewhat on the Bitterroot NF in the Selway-Bitterroot Wilderness, but increased to 1,995 acres along the

Sabe Creek north of the Salmon River on the Nez Perce NF (Table 2). The last two epidemics on the Nez Perce NF started in this drainage and spread west throughout the Forest.

Intensity and acreage of western spruce budworm activity in southern Idaho increased over 1984 levels. Douglas-fir, grand fir, and subalpine fir on approximately 2.6 million acres were defoliated in 1985 compared to 2.0 million acres in 1984. An increase in defoliation intensity was recorded in the moderate to heavy defoliation categories and a decrease was recorded in the light defoliation category.

Acreage of defoliated trees increased on the Boise, Caribou, Challis, Payette, and Sawtooth National Forests with infestations on the Payette, Salmon and Targhee National Forests remaining essentially constant. On all but the Salmon National Forest, the majority of these increases occurred in the moderate to heavy defoliation intensity categories.

Acreage infested by forest is displayed in Table 2. Locations of major infestations throughout southern Idaho are identified on the map in the appendix.

Table 2.-- Areas of defoliation by western spruce budworm as determined by aerial detection surveys, 1984-1985.

National[1] Forest	Year	Defoliation Category Acres Light	Moderate	Heavy	Total	Change
Bitterroot	1984	8,810	4,200	0	13,010	
	1985	9,406	0	0	9,406	- 3,604
Boise	1984	90,942	308,422	86,933	786,297	
	1985	101,236	403,835	476,830	981,901	+195,604
Caribou[2]	1984	8,875	108,119	28,112	145,106	
	1985	--	61,035	124,119	185,154	+ 40,048
Challis[2]	1984	615	--	--	615	
	1985	46,374	39,951	13,903	100,228	+ 99,613
Nez Perce	1984	100	356	0	456	
	1985	1,995	0	0	1,995	+ 1,539
Payette	1984	271,627	133,557	58,592	63,776	
	1985	81,195	166,105	280,340	527,640	+ 63,864
Salmon	1984	3,768	9,753	1,849	15,370	
	1985	14,389	--	--	14,389	- 981
Sawtooth	1984	102,779	31,042	10,688	144,509	
	1985	25,593	122,994	186,815	335,402	+190,893
Targhee	1984	173,444	212,113	91,409	476,966	
	1985	55,446	79,126	341,061	475,633	- 7,333
TOTAL	1984	860,960	807,562	377,583	2,046,105	
	1985	335,634	873,046	1,423,068	2,631,748	+585,643

[1] Includes State and private land.
[2] Only portions of Forest flown. Actual figures are probably considerably higher.

Larch Casebearer

The casebearer still infests the entire western larch type of Idaho. However, accurately estimating amounts of defoliation during aerial surveys in the summer is difficult because other agents such as needle diseases and insects can mask damage caused by the casebearer. Larch casebearer surveys are best done during the last week in May. During 1985, only 7,700 acres of defoliation were attributed to the casebearer in northern Idaho. In southern Idaho damage was detected infrequently on the Payette National Forest. Overall, the amount of defoliation is greatly reduced compared to prior years. Population outbreaks have been found only in small isolated spots.

Larch Budmoth

The larch budmoth prefers overstory, mature western larch trees on ridges on high plateaus. It periodically infests these types of larch stands in northern Idaho, but outbreaks only last one or two years. In 1985, about 74,800 acres of larch defoliation were attributed to the budmoth. Most of this defoliation occurred on the Bonners Ferry Ranger District.

Douglas-fir Tussock Moth

In southern Idaho the Douglas-fir tussock moth populations have dropped to lower levels than were found in 1984. Pheromone trap catches averaged 2.3 moths/trap for all trapping sites. No defoliation was noted during aerial detection surveys. The one spot of increased activity was within the city limits of Shoshone in south-central Idaho. An egg mass survey of the urban forest of the city showed an extensive infestation in both residential and city park trees. The city conducted a control project in the spring of 1985 soon after egg hatch. The effort was apparently successful as no defoliation was seen later in the summer and no adults were caught in pheromone traps used in a survey effort of the treatment area. Untreated sites still maintain high populations. Pheromone trap catches for both southern and northern Idaho are reported in Table 3.

In northern Idaho our pheromone trap, egg mass, and larval surveys have shown that the population in the area from Moscow to Plummer is continuing to increase. All other areas have declined with the peak having occurred in 1982 at low levels. In the Moscow/Plummer area no aerially visible defoliation was found although very light feeding damage could be seen from the ground in some areas. With the continued increase in the population, we expect to see aerially visible defoliation in 1986. This would appear to make 1986 correspond to 1973 of the last outbreak. The pheromone catch data is shown in Table 3. This year 41 plots had an average catch of 25 moths or more, compared to six plots with similar averages in 1984.

Table 3.--Average Douglas-fir tussock moth pheromone trap catches in Idaho, 1980-1985.

Area	No. of sample plots	Means of average moth catch per 5 traps/sample plot					
		1980	1981	1982	1983	1984	1985
		STATE & PRIVATE					
Sandpoint	2	0	0	.1	0	0	0
Coeur d'Alene	6	0	0	1.1	3.1	4.4	8.0
Plummer-Moscow	15	0	.8	8.2	12.3	17.5	85.8
Plummer-Moscow	18	*	*	2.5	3.3	7.0	43.2
Plummer-Moscow	13	*	*	*	4.3	9.0	35.2
Plummer-Moscow	1	*	*	*	*	36.4	68.4
Plummer-Moscow	2	*	*	*	*	*	76.0
Craig Mountains	7	*	2.7	.5	.5	.6	?
		NEZ PERCE NF					
Selway RD	4	.2	1.2	.7	.1	.1	
Slate Creek RD	5	0	1.6	2.8	.6	1.4	
Slate Creek RD	6	*	*	1.3	.3	0	
Elk City RD	3	*	*	.3	.1	0	
Red River RD	2	*	*	0	0	0	
Clearwater RD	1	0	0	0	0	0	
Clearwater RD	6	*	*	.6	.6	.3	
		CLEARWATER NF					
Lochsa RD	5	*	3.6	.2	0	0	
Canyon RD	8	*	*	8.7	*	*	
Pierce RD	18	*	*	.3	.1	.1	
Potlatch RD	8	*	*	1.8	4.5	13.0	
Powell RD	8	*	*	.3	.1	0	
		BOISE NF					
Cascade RD	2	*	.1	.3	20	0	1.0
Mountain Home RD	2	*	*	.3	21.7	.4	0
		PAYETTE NF					
Council RD	2	*	*	43.3	38.2	6.7	5.1
McCall RD	1	*	0	.6	11.0	.5	*
Weiser RD	3	*	*	43.3	42.1	8.1	4.1
		SALMON NF					
Cobalt RD	2	*	*	0	2.6	0	*
North Fork RD	2	*	*	11.4	38.7	1.9	*
		SAWTOOTH NF					
Burley RD	1	*	*	*	*	.2	*
Fairfield RD	3	*	1.6	5.2	20.3	6.3	0
Ketchum RD	1	*	*	2.6	14.8	.8	*
		OTHER FEDERAL					
Owyhee Mountains	2	27.8	55.8	*	*	10.8	.6

*Blanks indicate no traps were deployed.

DFTM SPRAY PROJECT 1985

During June 28 and 29, approximately 900 acres near Potlatch, Idaho, were treated with the Douglas-fir tussock moth virus. The project included six blocks--three treated and three untreated check areas. The application was made with a helicopter calibrated to deliver one gallon of spray mix per acre. Larval population samples were collected before treatment and 17 days following treatment. At five days after, larvae were collected to determine the infection rate. Larvae from the 5- and 17-day samples were laboratory reared on diet to estimate survival to the adult stage. Pheromone traps, egg mass, and cocoon data were also collected. Larval mortality at 17 days was 45 percent in the treated areas and 26 percent in the check areas. Of the larvae surviving at 17 days, another 66 percent in the treatment and 39 percent in the checks died before the adult stage. No visible defoliation was observed in the area during aerial surveys even though light defoliation could be seen from the ground. Two larval samples are planned for 1986: one to determine the degree of virus carryover, and a second to measure the larval population a year after treatment.

Although trap counts have not been made, it appears that counts for the general area (Moscow Mountain on the south to Mineral Mountain on the north) will be much higher than last year. Visible defoliation should be common throughout the area in 1986. This project was not expected to have an effect on the overall trend of the population buildup. A more complete application would be needed.

Western Pine Shoot Borer

The western pine shoot borer persisted as a pest of sapling- and pole-sized ponderosa pine stands in Idaho. Surveys were again conducted in conjunction with control efforts in three plantations of the Inland Empire Tree Improvement Cooperative. Effects of pheromone treatments on percentage of infested terminals are summarized in Table 4. In the three plantations tested, pheromone treatments substantially reduced number of infested terminals. Similar control treatments are planned for 1986.

Table 4.--Effects of Pheromone treatments on infestation of ponderosa pine terminals by the western pine shoot borer - 1985.

Plantation		Percent infested terminals		
		Pretreatment	Post treatment	Change
Lone Mountain	- Treated	16	14	-2
	- Check	41	42	+1
Tensed	- Treated	2	6	+4
	- Check	24	42	+18
Meadow Creek	- Treated	27	19	-8
	- Check	48	50	+2

The Tree Improvement Cooperative has decided to continue the pheromone treatment in several of the test plantations for at least five years until the next height measurement.

Gypsy Moth

A pheromone trapping survey was conducted by the Idaho Department of Lands, USDA Forest Service, Forest Pest Management for Region 4, and the Idaho Department of Agriculture across the State. No gypsy moths were caught in Idaho during 1985. The trapping program will be repeated in 1986.

Sugar Pine Tortrix

These insects continued to defoliate lodgepole pine on the Targhee National Forest in southeastern Idaho where over 56,000 acres were infested across the Teton Mountains. Isolated small areas of defoliation of both lodgepole and ponderosa pine were also noted in other forested regions of southern Idaho.

Pine Butterfly

As predicted, southern Idaho populations of pine butterfly declined in 1985 to the point that ponderosa pine defoliation was not recorded during aerial detection surveys. Scattered adults were seen in both southern and northern Idaho. Several reports of high numbers of adults were received from residents of the Hayden Lake area of northern Idaho, but no defoliation was seen.

MINOR INSECTS

Gouty Pitch Midge

Damage to lateral and terminal tips on ponderosa pine trees was evident from Coeur d'Alene north to Sandpoint. One area of very heavy damage was in the Lone Mountain Seed Orchard north of Rathdrum where some trees have been killed outright by this insect. Tip damage seems to be chronic along the Clearwater River from the Selway to Lewiston.

Hemlock Sawfly

A rare hemlock sawfly outbreak was detected in August 1985 along the Canadian border in Boundary Creek and north of Upper Priest Lake in northern Idaho. This might be the first record of this sawfly causing visible defoliation in Idaho. Several thousand acres of mixed western hemlock, subalpine fir, and Engelmann spruce trees were damaged. Western hemlock trees were the most heavily defoliated followed by subalpine fir and understory spruce trees. Several townships in this area also contained evidence of some sawfly feeding. An evaluation survey in October revealed that some hemlock trees along Boundary Creek may have been top-killed. The overwintering egg population was so low that it is doubtful that defoliation will be very heavy in 1986.

Cranberry Girdler Moth

This sod webworm has been causing economic damage in beds of bareroot seedlings at the USDA Forest Service Nursery, Coeur d'Alene, Idaho since 1980. Its favorite foods are the tap roots of 2-0 Douglas-fir and western larch seedlings. A spray program (six applications of insecticides) in 1984 reduced the

percentage of seedlings damaged to below 1 percent. In 1985, the number of male moths caught in pheromone traps was 5.3 moths/trap in mid-July. On this date in 1984 there were 39.0 moths/trap. Because of this low moth population, only one application of insecticide (Dursban) was used in late summer to kill larvae in the soil. In November during lifting operations, no damaged Douglas-fir seedlings were found in the beds where more than 12,000 seedlings were inspected.

Douglas-fir Needle Midge

This is a periodic pest in northern Idaho. Heavy damage was first seen in 1982 when it appeared along the Priest River Valley. In 1985, defoliation was most noticeable in the Palouse area, especially west of Plummer. This midge causes economic damage in Christmas tree plantations. Infested needles form "galls" which are shed in fall months.

Pine Needle Sheathminer and the Sugar Pine Tortrix

These two insects caused defoliation on 56,000 acres of lodgepole pine on the Targhee National Forest of southeastern Idaho. Defoliation of ponderosa pine caused by the sugar pine tortrix was also found at scattered locations throughout forested regions of southern Idaho.

Armyworm

In late July, beds of Engelmann spruce, Douglas-fir, lodgepole pine, western larch, and Jeffrey pine at Lucky Peak Forest Nursery were invaded by larvae of western yellow-striped armyworms. Larvae were feeding on foliage and were most numerous on Engelmann spruce and Douglas-fir. Infested beds were sprayed with the insecticide carbaryl to successfully suppress the population.

Seed and Cone Insects

Western white pine trees at the Moscow Arboretum were sprayed to protect them from the seed bug, cone moth, and cone worm. An aerial application of fenvalerate (Pydrin^{R}) was used on June 19, 1985. They harvested 1,671 bushels of white pine cones from this orchard that contained 0.64 pound of seed/bushel. This harvest was three times higher than their past highest harvest.

In early July, the Coeur d'Alene white pine seed orchard was sprayed with permethrin (Pounce^{R}) to protect cones from the seed bug. A hydraulic ground sprayer was used to apply the insecticide. A harvest of 179 bushels of cones was obtained. The Pacific Southwest Research Station will continue to study the amount of cone damage in this orchard.

In northern Idaho, the Intermountain Forest and Range Experiment Station has started a 5-year study to determine what factors are problems in western larch seed production areas. Preliminary results indicate that frost and three insect species are the major cause of damage.

Balsam Woolly Adelgid

Damage caused by this aphid increased in areas located during a survey of northern Idaho in 1984, but no new infested spots were found in 1985. Most tree mortality is occurring in subalpine fir growing in "frost pockets." Some grand fir seedlings in these areas show "gouting" and a few have died. Light populations of this aphid were detected on grand fir trees of all sizes that were growing close to heavily infested subalpine fir trees. No high elevation subalpine fir have been found infested to date. An impact study was made during the fall of 1985, and wood cores were extracted from infested fir trees. These cores will be "measured" to determine growth impact.

DISEASES

ROOT DISEASES

Root diseases are widespread throughout many different forest types in Idaho. Losses are especially severe in the north where mixed-conifer stands are attacked by several root disease fungi. Major root diseases include armillaria root disease, laminated root disease, annosus root disease, brown cubical root and butt rot, tomentosus root disease, and black stain root disease. Several root pathogens may occur together on the same tree and are often associated with bark beetle attacks. Major hosts in Idaho include Douglas-fir, grand fir, pine, Engelmann spruce, and subalpine fir.

Armillaria root disease is widespread throughout the State. In some stands, such as young pine plantations, it appears as an aggressive disease causing rapid tree mortality. In other instances, particularly in southern Idaho, the fungus is often a weak pathogen capable only of killing stressed trees. In the past, *A. mellea* has been designated as the cause of armillaria root disease. However, recent taxonomic work on the genus indicates that most sporophore collections from active root disease centers in northern Idaho should properly be classified as *A. ostoyae*. It is possible that aggressive pathogens may be different biological species than weak pathogens or saprophytes. If so, it may be possible to differentiate the potential root disease hazard of a stand on the basis of different *Armillaria* species.

Occurrence of annosus root disease is apparently much more widespread in northern Idaho than previously believed. Recent evaluations on the Clearwater and Nez Perce National Forests indicated that several stands with typical armillaria root disease symptoms actually had high incidence of annosus root disease. Occurrence was especially severe on Douglas-fir, an infrequent host elsewhere in the western United States. Annosus root disease has long been associated with sapling- and pole-sized pine mortality in the State. It is possible that the fungus enters young pine stands by infecting freshly cut stumps from the previous crop. Partial cutting or thinning infected stands may accelerate root disease losses if stump infection is common. It is important that proper diagnosis of causal organisms be made when formulating alternatives for reducing root disease losses.

Brown cubical butt rot is common throughout the State, particularly in stands of old-growth Douglas-fir and ponderosa pine. Seriously affected trees are often attacked and killed by bark beetles. In southern Idaho, affected stands are frequently attacked by other root diseases, particularly tomentosus root disease.

Tomentosus root disease is frequently detected in roots of windthrown or uprooted Douglas-fir throughout southern Idaho and occasionally in subalpine fir in southwestern Idaho. During 1985, the fungus was found killing suppressed Douglas-fir in the Stoddard Creek Campground, Targhee National Forest.

Black stain root disease affects mostly pine and Douglas-fir and causes vascular staining, often in streaks. Black stain was found for the first time on pinyon pine in the Albion Mountains in southern Idaho. Several different fungi in the genus Leptographium are probably responsible for this type of disease. These fungi have previously been incorporated into the genus Verticicladiella. However, recent mycological work indicates that the genera Leptographium and Verticicladiella should be synonymous. Rules of toxonomic nomenclature indicate that Leptographium has preference. Identification of associated organisms is currently underway.

FOLIAGE DISEASES

Red Band Needle Blight

Because of dry spring weather in northern Idaho, damage due to red band needle blight was very slight in 1985. However, heavy defoliation and occasional seedling mortality continued near the confluence of the Middle Fork of the Weiser River and Lightning Creek in southern Idaho.

Larch Foliage Diseases

Incidence of larch foliage diseases in northern Idaho was generally less than in previous years due to dry weather during the spring and early summer. However, disease severity in west central Idaho increased after several years of very low infection.

Elytroderma Needle Cast

Elytroderma needle cast is a perennial problem in ponderosa pine stands throughout the State. It rarely causes much concern, but last spring the pine stands around Little Donner Pass north of Cascade, Idaho, showed extensive damage. Many of these trees had been severely weakened by successive years of defoliation from the pine butterfly which may have contributed to the severity of the damage. Many of these trees are now being killed by bark beetles. Some local homeowners are hoping to avoid losses by spraying trees with insecticides to prevent bark beetle attacks.

Lodgepole Pine Needle Cast

Several lodgepole pine stands in the Sawtooth National Recreation Area continue to have moderate levels of infection. Moderate to heavy infection levels were

observed during 1985 in the bottoms of drainages around Cascade and the central mountains of Idaho.

Douglas-fir Needle Diseases

Epidemic levels of rhabdocline needle cast were observed in Douglas-fir stands in eastern Idaho, most notably in the Centennial Mountains on the Idaho/Montana border. Much of this area is also currently heavily infested with the spruce budworm, and this combination of pests is apparently causing mortality of sapling-sized trees.

Swiss needle cast continues to be observed throughout north Idaho on Douglas-fir. Infection levels in 1985 were rather light and no areas of high infection rates were observed.

Miscellaneous Foliage Diseases

Fir broom rust occurs throughout the state on subalpine fir. Heavily infected areas observed in 1985 were south of Twin Falls and Burley and in eastern Idaho. Grand fir and subalpine fir on the Council Ranger District of the Payette National Forest were infected with a fir needle cast. True firs in southwestern Idaho were also lightly infected by a needle rust.

Lodgepole pine is occasionally infected by western pine-aster rust throughout the host type in southern Idaho.

Although aspen is not presently a commercial timber species in Idaho, it is a widely distributed and important ornamental. Aspen in the Targhee National Forest in eastern Idaho were heavily infected with a mixture of three foliage diseases (Marssonina blight, Septoria leaf spot and canker, and poplar shoot blight) as well as the aspen leaf miner insect.

STEM AND BRANCH DISEASES

Dwarf Mistletoes

Dwarf mistletoes attack most conifer species throughout Idaho. Severe infections can reduce tree growth, wood quality, and cone crops, and may predispose trees to attack by other agents. Aerial detection surveys do not include dwarf mistletoes because light infections cannot be seen and dense stands frequently mask even heavily infected trees. Although mortality is rare, growth reduction in heavily infected stands may be substantial. In many situations, losses can be greatly reduced by silvicultural practices.

Each year more Ranger Districts develop long-range plans for dwarf mistletoe suppression. Primary interest is in protecting partially or fully regenerated stands threatened by dwarf mistletoes.

Dwarf mistletoe suppression projects are conducted to "clean up" a diminishing acreage of previously harvested stands in which infected trees were left and now overtop established regeneration. The dwarf mistletoe suppression program

is a sequential process of presuppression survey, evaluation, control, and post-control evaluation. Accomplishments for 1985 are reported in Table 5.

Table 5.--Dwarf mistletoe accomplishments - southern Idaho, 1985.

National Forest	Presuppression Survey Acres	Suppression Project Acres	Post-Suppression Evaluation Acres
Boise	47,839	699	319
Caribou	9,465	150	0
Challis	2,440	70	35
Payette	20,198	272	0
Salmon	18,000	106	330
Sawtooth	0	54	400
Targhee	16,600	1,729	3,705
BLM - Idaho	7,400	0	0
TOTAL	121,942	3,080	4,789

STEM CANKERS

White Pine Blister Rust

Occurrence of white pine blister rust remains a severe handicap in managing western white pine throughout northern Idaho. Losses from the disease have declined over the past few years as harvested stands have been regenerated with more resistant white pine stock and mixtures of other species. A guide for managing western white pine in the presence of blister rust is being compiled by Cooperative Forestry and Pest Management, Intermountain Forest and Range Experiment Station, and the Clearwater National Forest. In this guide, infection levels and prevalence of *Ribes* will be used to assess site hazards. The guide will use computerized models to predict rates of white pine survival in sites with different hazards. Site hazards and infection levels will be used to develop alternatives for intermediate treatments and site regeneration.

Comandra Blister Rust

This stem rust is common on lodgepole pine of all size classes in south central and southeastern Idaho. During 1985, it was also found on ponderosa pine in the Mink Creek drainage south of Pocatello.

Miscellaneous Stem Cankers

Stalactiform rust is a serious problem in dense stands of lodgepole pine in central and southern Idaho. Western gall rust occurs throughout the state on ponderosa and lodgepole pine. It is most often seen as a problem in young trees and as branch cankers in older trees. Old stem cankers cause severe stem weakening which may render trees hazardous in recreation areas. Atropellis

canker was observed on lodgepole in isolated areas, particularly in northern Idaho.

Dasyscypha canker was observed occasionally on sapling-sized pines in southern Idaho, especially those stressed by other agents.

Cytospora canker caused branch dieback on several hardwood species in southern Idaho.

STEM WILTS

Dutch Elm Disease

The city of Boise has the largest population of American elm trees in the State. Over the past several years this number has been reduced to about 2,200. An additional 38 trees died last year. Boise no longer is involved in expensive preventive programs, and is concentrating its efforts on replacing elms with more desirable tree species.

DECAYS

Indian paint fungus is the major cause of defect in mature true fir and hemlock throughout the State. Shorter rotations and logging practices which minimize wounding are expected to reduce losses.

Red ring rot is probably the most widespread stem decay of pines, larch, Douglas-fir, and spruce in the State. Although losses are usually small, in some areas in southern Idaho, up to 50 percent of the volume may be affected.

Aspen canker and trunk rot can be found in most aspen stands throughout Idaho, and can be especially damaging in older stands.

ABIOTIC PROBLEMS

A heat wave in early spring caused some unusual problems throughout the State. Temperatures in the 90's were recorded for several days in mid-April. This desiccated many older needles, resulting in a "sunburn" effect. The most severely injured needles turned red and dropped prematurely.

This was followed by one of the driest summers on record. As a result, most conifer species experienced varying degrees of premature needle shed of older needles.

Winter Drying

Sapling-sized pines and firs on the Boise, Payette, and Targhee National Forests exhibited symptoms indicative of winter drying. Observed damage included red and dead needles on all foliage up to about four feet above the snow line. Discoloration was most notable on the south-facing portions of tree crowns. Dead buds were found, but generally only on the lateral branches. By midsummer, the trees appeared normal as most of the red needles had dropped and new foliage masked any discoloration.

Christmas tree growers in the Cascade area also experienced winter drying damage on Scotch pine Christmas trees.

Snow Breakage

Unusually heavy snow accumulations were recorded in many areas of the State last winter. Many trees snapped under heavy snow loads, thus creating potential bark beetle breeding areas. Damage was also apparent on Scotch pine Christmas tree plantations in Cascade and Sandpoint which had not been sheared the previous year.

Hail Damage

A severe, localized hail storm caused branch flagging of ponderosa pine in a 50-acre plantation about ten miles northwest of Burgdorf, Idaho, on the Payette National Forest.

NURSERY DISEASES

Fusarium Root Disease

One of the major diseases of containerized conifer seedlings in northern Idaho nurseries in 1985 was mortality and tip dieback caused by several species of Fusarium. The disease was most serious on Douglas-fir, but was also detected on Engelmann spruce, true fir, western larch, and several species of pine. The same fungi induced early damping-off losses and cotyledon blight. Root disease in older seedlings was likely enhanced by seedling stress required for bud set prior to removing seedlings from greenhouses. Most disease inoculum may have been seedborne. Evaluations to assess role of seed-borne inoculum, secondary spread, periodicity of infection, and impact of withholding water and nutrients from seedlings on disease development are planned.

Grey Mold

Grey mold continued to be a major problem on containerized western larch at the USDA Forest Service Nursery in Coeur d'Alene. Other species affected included lodgepole pine and Engelmann spruce. Although fungicides helped reduce losses, total control of the disease was not obtained with chemicals.

Meria Needle Cast

Incidence of Meria needle cast was very low on bareroot larch seedlings at the USDA Forest Service Nursery in Coeur d'Alene in 1985. Preventative fungicides were applied periodically in the spring but were not required during the summer because of warm, dry weather.

Sirococcus Tip Blight

This disease continued to cause losses in most Engelmann spruce seedlots of container stock at the USDA Forest Service Nursery in Coeur d'Alene. Secondary spread from infection foci was evident in seedlings several months old.
Tip blight of bareroot pine seedlings was less damaging at nurseries in Bonners

Ferry than in previous years. Warm, dry weather early in the growing season probably contributed to reduced disease incidence.

Diplodia Tip Blight

Fungicide trials to reduce impact of Diplodia tip blight on 2-0 bareroot ponderosa pine seedlings at the Fantasy Farms Nursery near Peck were inconclusive because of very low disease incidence. Warm, dry weather throughout late spring and early summer was probably the main factor contributing to low disease incidence. Further tests in both 1-0 and 2-0 pine beds are planned so that growers will have fungicide options available should they become necessary in the future.

Phoma Blight

Tip blight of conifer seedlings associated with fungi from the genus Phoma was encountered at several bareroot and containerized nurseries. Although the role of these fungi in disease initiation remains unknown, their frequent association with diseased tissues indicates that they may be important.

Lodgepole Needletip Dieback

Extensive needletip dieback of 2-0 bareroot lodgepole pine seedlings at the USDA Forest Service Nursery in Coeur d'Alene became evident during late spring. Symptoms were not associated with root pathogens. Although cause of the malady was not positively determined, fertilizer burn or extensive drying of seedlings may have been involved.

Frost Damage

A severe April frost killed terminal buds of thousands of 2-0 Engelmann spruce, Douglas-fir, and western larch at the Lucky Peak Nursery, Idaho.

COOPERATIVE TRAINING

The Idaho Department of Lands and Forest Service, Northern Region, continued a cooperative training program in northern Idaho in 1985. The training program was divided into two types of sessions: a "basic" session in which field identification and life cycles of pests were stressed, and an "advanced" session during which management alternatives were emphasized. The basic sessions were designed primarily for field-oriented personnel such as stand exam crews. The advanced session was conducted for silviculturists, foresters, and others involved in stand management.

In 1985, a basic session was held at Sandpoint and an advanced session was conducted at Headquarters on the Clearwater NF. In 1986, an advanced session is planned for Sandpoint or St. Maries.

DIRECTORY OF PERSONNEL

Idaho Department of Lands
Bureau of Private Forestry
P.O. Box 670
Coeur d'Alene, ID 83814 Phone: 208/664-2171

Dewey P. Almas	Bureau Chief
R. Ladd Livingston	Section Supervisor, Entomologist
John W. Schwandt	Forest Pathologist
David P. Beckman	Technician, I&D Section

USDA Forest Service, Northern Region (1)
Cooperative Forestry and Pest Management
Federal Building
P.O. Box 7669 Phone: 406/329-3280
Missoula, MT 59807 FTS: 8-585-3280

John H. Thompson	Staff Director
Robert G. Eder	Computer Programer/Analyst
Rene-Marc Mangin	Toxicologist
James W. Byler	Pathology Group Leader
Susan K. Hagle	Forest Pathologist
Robert L. James	Forest Pathologist
Lionel Hall	Biological Technician
Carma J. Gilligan	Biological (Laboratory) Technician
Jerald E. Dewey	Entomology Group Leader
Kenneth E. Gibson	Forest Entomologist
Wayne E. Bousfield	Forest Entomologist
Scott Tunnock	Forest Entomologist
Larry E. Stipe	Forest Entomologist
Robert D. Oakes	Biological Technician
Hubert E. Meyer	Biological Technician

USDA Forest Service, Intermountain Region (4)
Forest Pest Management
Federal Building
324 - 25th Street
Ogden, UT 84401

Phone: 801/625-5257
FTS: 8-586-5257

Max M. Ollieu	Group Leader
David G. Holland	Ogden Field Representative
Borys M. Tkacz	Forest Pathologist
Ann Keysor	Biological Technician

USDA Forest Service, Intermountain Region (4)
Forest Pest Management
Boise Field Office
1750 Front Street
Boise, ID 83702

Phone: 208/334-1345
FTS: 8-554-1345

Ralph E. Williams	Boise Field Representative
Donn B. Cahill	Forest Entomologist
R. W. Thier	Forest Entomologist
Julie Weatherby	Forest Entomologist
James T. Hoffman	Forest Pathologist
Jack P. Marshall	Forest Pathologist
K. Andrew Knapp	Biological Technician

INDEX OF INSECTS AND DISEASES

INSECTS

Common name	Scientific name
Balsam woolly adelgid	*Adelges picea* (Ratzburg)
Cone moth	*Eucosma recissoriana* Heinrich.
Cone worm	*Dioryctria abietivorella* (Grote')
Cranberry girdler moth	*Chrysoteuchia topiaria* (Zeller)
Douglas-fir beetle	*Dendroctonus pseudotsugae* Hopk.
Douglas-fir needle midge	*Cortarinia* sp.
Douglas-fir tussock moth	*Orgyia pseudotsugata* McDunnough
Fir engraver	*Scolytus ventralis* LeConte
Gouty pitch midge	*Cecidomyia piniiopis* O. S.
Gypsy moth	*Lymantria dispar* (L.)
Hemlock sawfly	*Neodiprion tsugae* Middleton
Larch budmoth	*Zeiraphera improbana* (Walker)
Larch casebearer	*Coleophora laricella* (Hub.)
Mountain pine beetle	*Dendroctonus ponderosae* Hopk.
Pine butterfly	*Neophasia menapia* (Felder & Felder)
Pine engraver	*Ips pini* (Say)
Pine needle sheatminer	*Zelleria haimbachi* Busck.
Seed bug	*Leptoglossus occidentalis* Heidemann
Spruce beetle	*Dendroctonus rufipennis* (Kirby)
Sugar pine tortrix	*Choristoneura lambertiana* (Busk)
Western pine beetle	*Dendroctonus brevicomis* LeConte
Western pine shoot borer	*Eucosma sonomana* Kearfott
Western spruce budworm	*Choristoneura occidentalis* Freeman

INDEX OF INSECTS AND DISEASES

DISEASES

Common name	Scientific name
Annosus root disease	*Heterobasidion annosum* (Fr.) Bref.
Armillaria root disease	*Armillaria ostoyae* (Romagn.) Herink
Aspen canker	*Valsa sordida* Nits.
Aspen trunk rot	*Phellimus tremulae* (Bond) Bond & Boriss
Atropellis canker	*Atropellis piniphila* (Weir) Lohm. & Cash
Black stain root disease	*Leptographium* spp.
Brown cubical butt rot	*Phaeolus schweinitzii* (Fr.) Pat.
Comandra rust	*Cronartium comandrae* Peck.
Diplodia tip blight	*Diplodia pinea* (Desm.) Kickx.
Dothistroma needle blight	*Scirrhia pini* Funk & Park.
Dutch elm disease	*Ceratocystis ulmi* (Buism.) C. Mor.
Dwarf mistletoes	*Arceuthobium* spp.
Elytroderma needle cast	*Elytroderma deformans* (Weir) Darker
Fir broom rust	*Melampsorella caryophyllacearum* Schroet.
Fir needle cast	*Lirula* spp.
Fir needle rust	*Pucciniastrum* spp.
Fusarium root disease	*Fusarium oxysporum* Schlect.
Grey mold	*Botrytis cinerea* Pers. ex Fr.
Indian paint fungus	*Echinodontium tinctorium* (Ell. & Ev.) Ell. & Ev
Ink spot of aspen	*Cibornia (Sclerotinia) bifrons* (Whetz.) Whetz.
Laminated root rot	*Phellinus weirii* (Murr.) Gilb.
Lodgepole pine needle cast	*Lophodermella concolor* (Dearn.) Darker

DISEASES (continued)

Marssonina blight	*Marssonina populi* (Lib.) Magn.
Meria needle cast	*Meria laricis* Vuill.
Phoma blight	*Phoma eupyrena* Sacc.; *Phoma pomerum* Thuem.; *Phoma glomerata* (Cda) Wr. & Hochapf.
Poplar shoot blight	*Venturia macularis* (Fr.) Mull. & Ark
Red Band needle blight	*Scirrhia pini* (Funk & Park.)
Red ring rot	*Phellinus pini* Pilat. (=*Fomes pini* (Thore) (Lloyd)
Rhabdocline needle cast	*Rhabdocline pseudotsugae* Syd.
Septoria leaf spot & canker	*Septoria* sp.
Sirococcus tip blight	*Sirococcus strobilinus* Preuss.
Stalactiform rust canker	*Peridermium stalactiforme* Arth. & Kern (=*Cronartium coleosporioides* Arth.)
Swiss needle cast	*Phaeocryptopus gaumanni* (Rhode) Petr.
Tomentosus root disease	*Inonotus tomentosus* (Fr.) Gilb.
Western gall rust	*Endocronartium harknessii* (Moore) Hirat.
Western pine-aster rust	*Colesporium asterum* (Diet.) Syd.
White pine blister rust	*Cronartium ribicola* Fisch.

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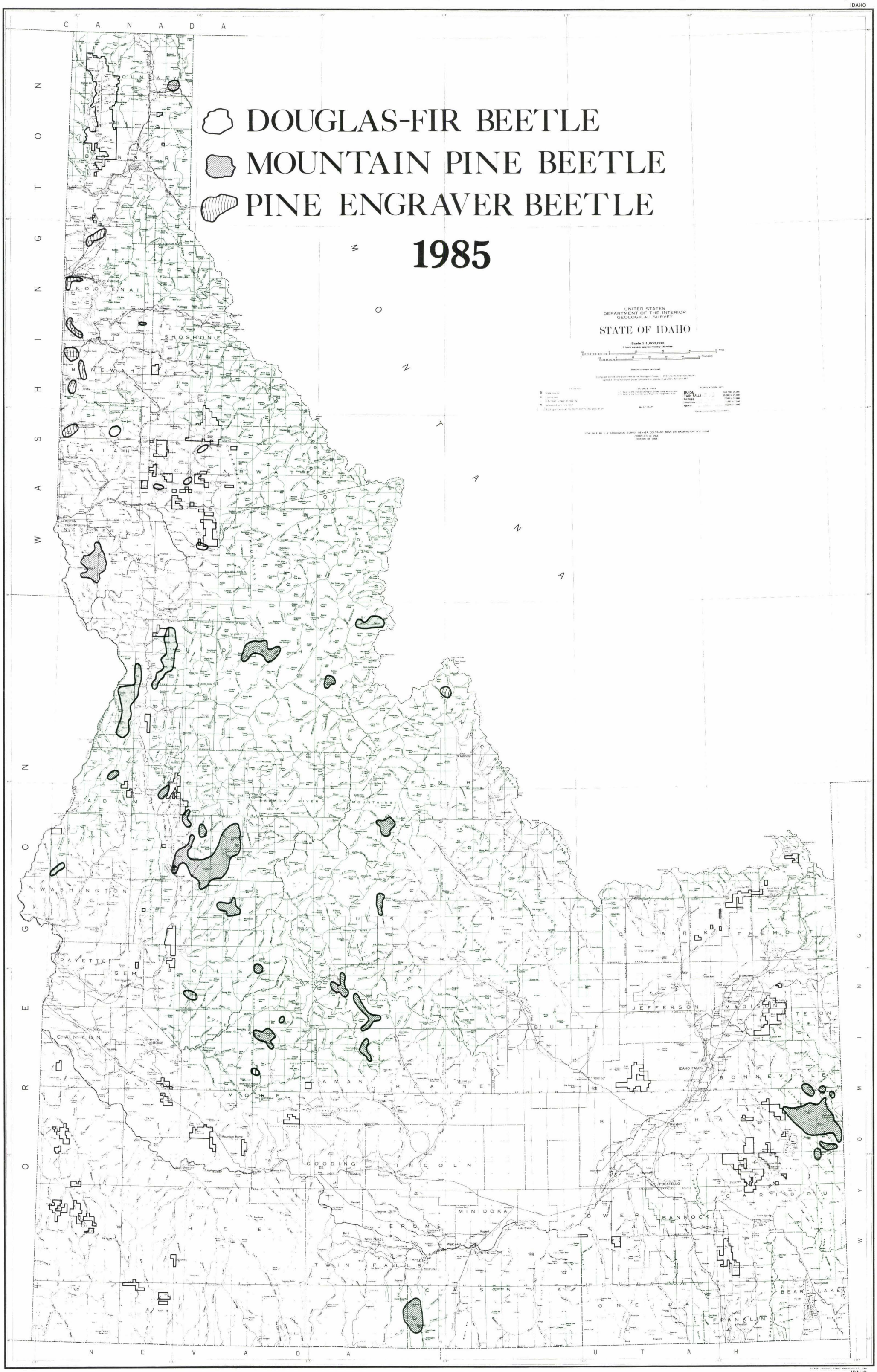
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PINE ENGRAVER BEETLE
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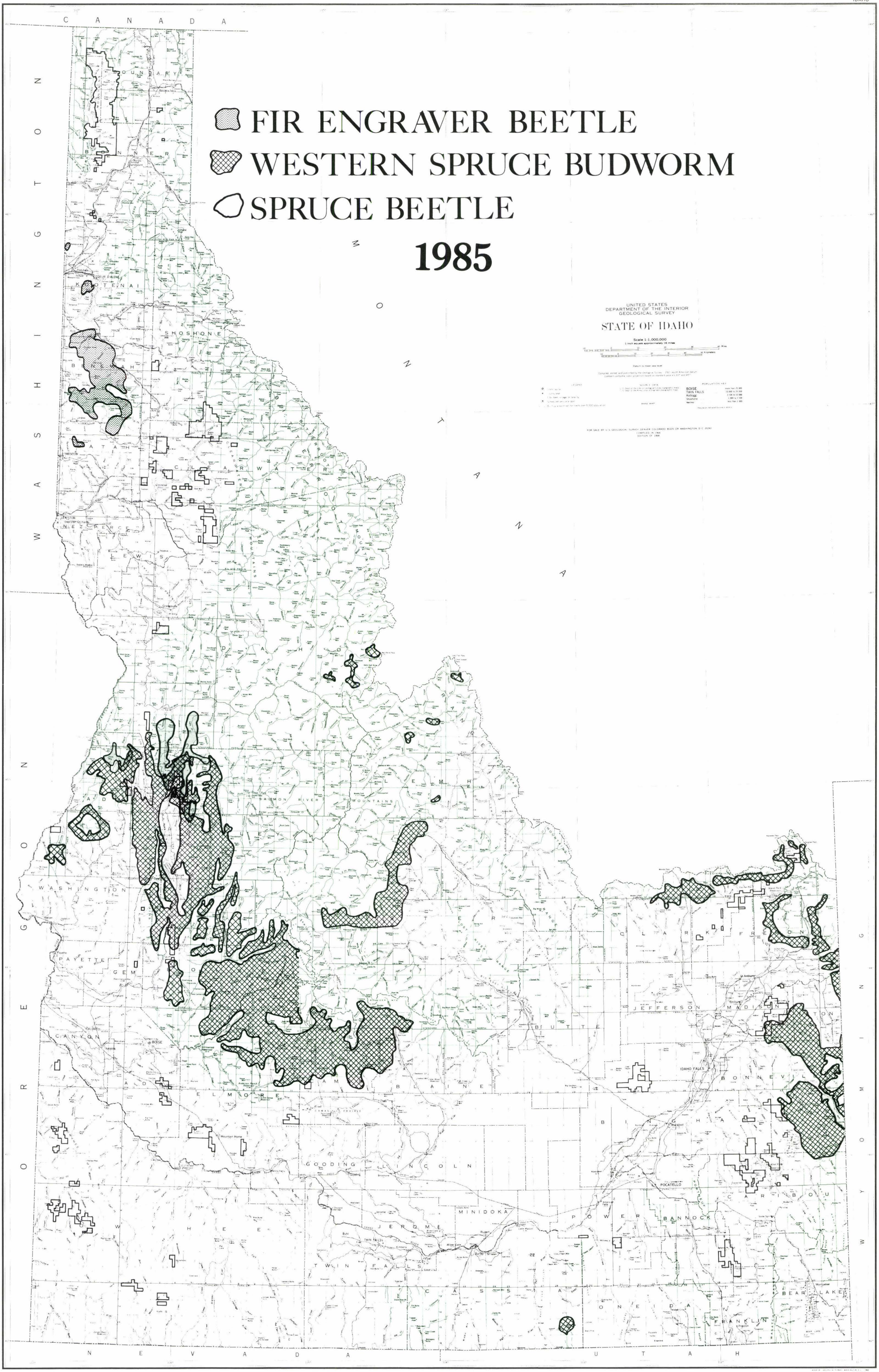
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